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EXPLANATION OF PLATE I.

FIG. 1.—Belostoma larva, to show the location of the pulsatile organs. In all three pairs of legs they are in the tibia, just below the articulation with the femur.

FIG. 2.—Location of the pulsatile organ in the legs of Corixa. In this genus the chitinous cord, to which the pulsatile organ seems attached, is set in motion by its beating. The motion of this cord sometimes extends through three joints.

FIG. 3.—Ranatra, adult, to show the exceptional position of the pulsatile organ in the fore legs.

FIG. 4.—The pulsatile organ as seen in the tibia of an adult Ranatra. At the posterior end are seen the attachments extending upwards and backwards to the integument of the legs. Crossing the anterior end and middle portion are the oblique muscular fibers of the legs. The tracheæ are plainly shown. The arrows indicate the direction of the blood currents.

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ON THE CHARACTER AND FUNCTION OF THE EPIGLOTTIS IN THE BULL-SNAKE (PITYOPHIS).[1]

BY CHARLES A. WHITE, M.D.

AMONG the more commonly known serpents of the United States there is a group of species which naturalists range under the generic name of Pityophis, and which are distributed from the Atlantic to the Pacific coast. To all these species the popular name of bull-snake is applied, and the more common eastern variety is also often popularly called the pine-snake. They are great, good-natured fellows, always getting out of man's way when they can, but occasionally, if they are pressed, they will throw themselves into a somewhat threatening attitude and emit a peculiar hiss. The old naturalist, William Bartram, spoke of it as a "terrible hiss, resembling distant thunder," but even with the popular dislike to serpents, I think few persons would regard the hiss of the bull-snake as at all terrible or thunderous.

Baird and Girard, Cope. and Yarrow, have all published lists of species of Pityophis. Baird and Girard enumerated seven species; Cope, five species, dividing one of them into three varieties; and Yarrow four species, dividing one of them in two varieties.

All these forms have similar habits, and all, at times, produce a similar hoarse, hissing sound. It is well known that a hissing sound is produced by other serpents as well as other animals; but the hiss of the bull-snake has a peculiar hoarseness which is sometimes so loud that, with the help of the imagination, it appears to have suggested a likeness to the low, rumbling bellow of the bull; hence the popular name of these serpents. The peculiarity of the hiss of the bull-snake is due to the character and posture of the epiglottis. This organ is absent, or represented only by a small tubercle, in all other serpents which I have examined. It is present in all the species and varieties of Pityophis. It is of the same general character in all, although it varies a little in shape in the different species, and also somewhat in different individuals. I therefore regard this feature as a generic character, although it is not improbable that some of the nearer allies of Pityophis will be found to possess a similar epiglottis. The accompanying figures, drawn from nature by my friend Dr. R. W. Shufeldt, U. S. Army, represents the mouth-parts of *Pityophis sayi* var. *bellona.* The

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[1] Read before the Biological Society of Washington, October, 1883.

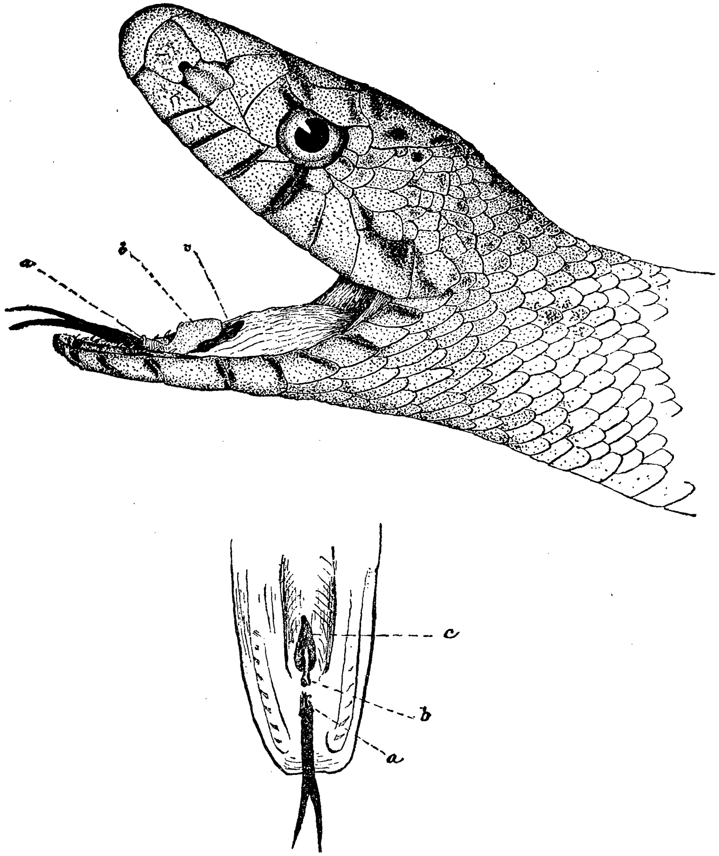

FIG. 1.—Lateral and view from above of Mouth Parts of the Bull Snake.

tongue-sheath is represented at *a;* the epiglottis at *b;* and the rima-glotidis (aperture of the windpipe) at *c.*

The epiglottis is a thin, erect, flexible, flag-shaped or curved-spatulate body, situated upon the median line immediately in front of the rima-glotidis, and with its free end directed upward and backward, its posterior edge curving partly over the rima. It is evidently this epiglottis that produces the hoarseness of the hissing sound, which it accomplishes by dividing, and fluttering in, the strong current of air which is forced from the lung out of the rima.

That this peculiar body is really the homologue of the epiglottis in the higher animals, is shown by its position in relation to the other parts of the mouth. It differs from the epiglottis in those animals by being placed longitudinally instead of transversely, and in not being hinged, and therefore not capable of falling down to cover the rima in the act of swallowing. As serpents' food is not comminuted, but swallowed whole, such protection to the rima is unnecessary.

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THE CAROLINA WREN; A YEAR OF ITS LIFE.

BY CHARLES C. ABBOTT, M.D.

EARLY in the morning of Sept. 1, 1882, as I was passing near the stable, my attention was called to the shrill notes of an excited little bird that, darting from the building, alighted on the fence near by and screamed *Jimmée, Jimmée, Jimmée,* so loudly, that every James in the township should have hastened thither. No response came, and again the call, a clear, penetrating whistle, was repeated. This continued, at brief intervals, for two or three minutes, and then, as quickly as it came, the bird flew back to the stable, entering through a knot-hole in a weather-board with such rapidity of movement that I could but marvel at its dexterity.

Half an hour later I saw this same bird again, coming from the stable through the same knot-hole, and this time it sang as loudly, impatiently and frequently as before, but the notes were different. It said, or seemed to say, *tsau-ré-ta, tsau-ré-ta, tsau-ré-ta.* Had I not seen the bird I should have recognized it by a peculiarity in its song, which was never wanting whatever might be the particular notes it uttered. My attention being called to this little bird—the Carolina wren (*Thryothorus ludovicianus*)—I deter-